

(19) World Intellectual Property
Organization
International Bureau



Rec'd PCT/PTO 32 FEB 2005



(43) International Publication Date
4 March 2004 (04.03.2004)

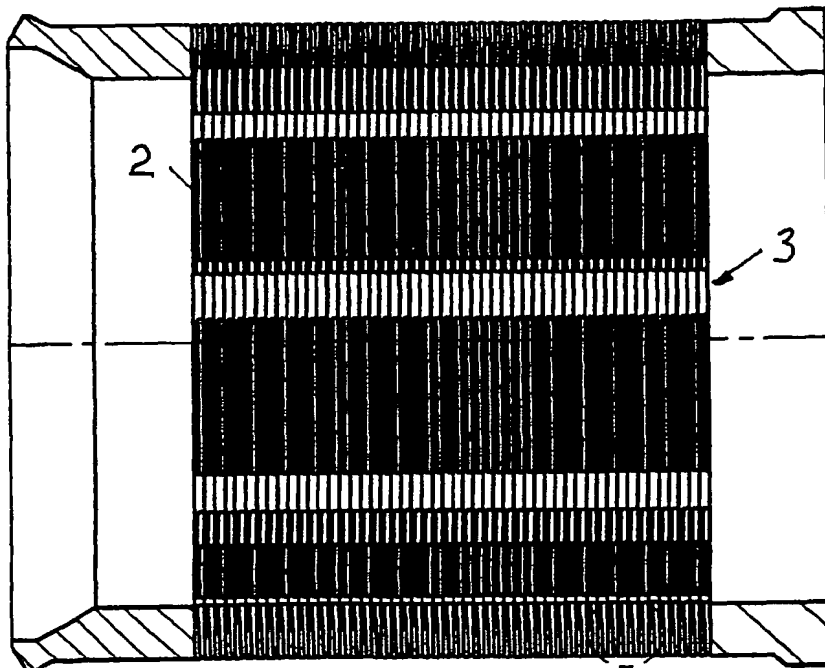
PCT

(10) International Publication Number
WO 2004/018076 A1

- (51) International Patent Classification⁷: **B01D 29/46** (74) Agent: BJELKSTAM, Peter; Bergenstråhle & Lindvall AB, P.O. Box 17704, S-118 93 Stockholm (SE).
- (21) International Application Number: PCT/SE2003/001301
- (22) International Filing Date: 21 August 2003 (21.08.2003)
- (25) Filing Language: Swedish
- (26) Publication Language: English
- (30) Priority Data:
0202526-0 22 August 2002 (22.08.2002) SE
- (71) Applicant (for all designated States except US): CCI VALVE TECHNOLOGY AB [SE/SE]; Box 603, S-661 29 Säffle (SE).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): KARLEBRATT, Claes [SE/SE]; Olof Trätäljargatan 13, S-661 30 Säffle (SE).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: SCREEN FOR GASES



B

(57) Abstract: The invention refers to a screen for gases intended to prevent passage of particles bigger than different, defined dimensions at the same time as the pressure drop existing over the screen is as low as possible. The screen (1) is built up of rings (2) connected together to a cylindrical package, which are individually separated by spacers (3) in order to create slits (5) between the rings (2), which have dimensions adapted to the actual particles.

WO 2004/018076 A1

Rec'd

WO 2004/018076 A1



Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

SCREEN FOR GASES

The present invention refers to a screen for gases intended to prevent passage of particles bigger than
5 different defined dimensions near the valve seats in a valve at the same time as the pressure drop existing over said screen is as low as possible.

The different types of screens today existing on the
10 market in order to prevent that particles bigger than different defined, customer-specified dimensions can pass the screen and cause problems with the tightening, show usually different types of hollow formations in cylinder covers or grating formations. One problem with this type
15 of screen devices is that difficulties arise to dimension those slits in a simple way so that they prevent the passage of actual particles at the same time as the pressure drop over the screens is influenced negatively.

20 The object of the present invention is to eliminate the problems stated above and provide a screen, which has slits which very easy can be dimensioned to the dimensions specified by customers at the same time as the pressure drop over the screen can be kept as low as possible. The
25 characterizing features of the invention are set forth in the following claims.

Thanks to the invention a screen of the type mentioned above has now been provided, which in an excellent way
30 fulfils its purposes at the same time as it is also simple and cheap to manufacture. Since the screen is built up of to a cylindric package connected rings, which are separated individually by spacers, slots or rings can be created in a very easy way, which have dimensions adapted

to the actual particles. Furtheron, the rings can be connected to each other into a package in a simple way in that the spacers are formed such as lips or shoulders on the rings in creating said slits and by aid of fixing joints on the periphery of the shoulders, the rings are orientated in position relatively each other. In order to keep the pressure drop over the screen as low as possible the dimension of the slits between the rings are formed so that said dimension increases in the actual flow direction of the medium, which creates a "Laval-nozzle" (recovery cone) for pressure recover.

The invention is described closer below by aid of a preferred embodiment example in view of the drawings enclosed, in which

Fig. 1 shows a side view in section of a screen according to the invention intended for location in a valve housing,

Fig. 2 shows in a view enlarged a partial view in section of the rings and the slits between these,

Fig. 3 shows a perspective view of screen arrangement according to the invention intended to be mounted into a valve,

Fig. 4 shows the view illustrated in fig. 3 in a cross-section, from which can be seen how the screen arrangement is fixed in position before a montage into a valve,

Fig. 5 shows a schematic cross-section of the screen according to fig. 4 along a plane B-B and

5 Fig. 6 shows how a screen arrangement according to the invention can be mounted into a valve.

As can be seen closer in the drawings and especially in fig. 1,2 and 5 a preferred embodiment example is here
10 illustrated of a screen 1 according to the invention, which is built up of rings 2 connected into a cylindrical package, said rings are separated individually by spacers 3 in the form of lips or shoulders 4 in creating of slits 5 between the rings, which have dimensions adapted to the
15 particles which are intended to be separated by aid of the screen 1. By this structure of the screen the same comprises slits 5 having different defined dimensions, which are created between the shoulders and which per se give an effective screen function. What can be seen from
20 the figures the spacers 3 in the form of the shoulders 4 can be provided in a predetermined number and pattern between the rings on and around the circumference of the rings 2.

25 From fig. 2 and 5 can better be seen that the rings 2 comprise sheet formed washers 6 having a centrally located hollow formation 7, which is limited by a continuous strip 8 extending in the plane of extension of the washers 6, which has a predetermined width and a thickness which
30 continuously decreases in the direction towards the hollow formations 7, so that the dimension of the slits increases in a direction inwards to the hollow formations 7 or in the actual flow direction of the medium in order to receive a pressure recover in the gas flow.

As mentioned above the shoulders 4 of the screen 1 are intended to create the actual slit 5 which is wanted and a weld-joint 9 is provided to keep the rings 2 together into a package by that the weld-joint 9 extends over the outer periphery of the shoulders 4. The dimension of the rings 2 i.e. the outer and inner diameter is determined by the equipment, which the screen is intended to work together with and in fig. 6 is illustrated in a cross-section how the screen according to the invention can be mounted in a valve. The number of rings 2, which shall be placed in the final screen, are determined by the maximum pressure drop which is permitted for actual installation and the maximum pressure drop over the screen often is customer-specified.

20

25

30

Claims

1. A screen for gases intended to prevent passage of
5 particles bigger than different defined dimensions at the
same time as the pressure drop existing over the screen is
as low as possible, said screen (1) is built up of to a
cylindrical package connected rings (2), which are
individually separated by spacers (3) for creating slits
10 (5) between the rings (2), which have dimensions adapted
to the actual particles, **characterized in** that the rings
(2) consist of sheet-formed washers (6) having a centrally
located hollow formation (7) limited by a continuous strip
(8) extending into the plane of extension of the washers
15 (6), said strip has a predetermined width and a thickness
which continuously decreases in direction towards the
hollow formation (7), the width of the slits being
increased in the flow direction of the actual medium in
order to receive a pressure recover in the gas flow and
20 that the spacers (3) consist of shoulders (4) on the rings
(2) in creating said slits (5), said shoulders (4) are
provided in a predetermined pattern and number between the
rings (2) and around the circumference of the rings (2) at
the same time as the rings (2) are kept together into a
25 package by aid of the shoulders (4).

2. A screen according to claim 1, **characterized in**
that the rings (2) are kept together into a package by aid
of weld-joints (9) extending over the outer periphery of
30 the shoulders (4).

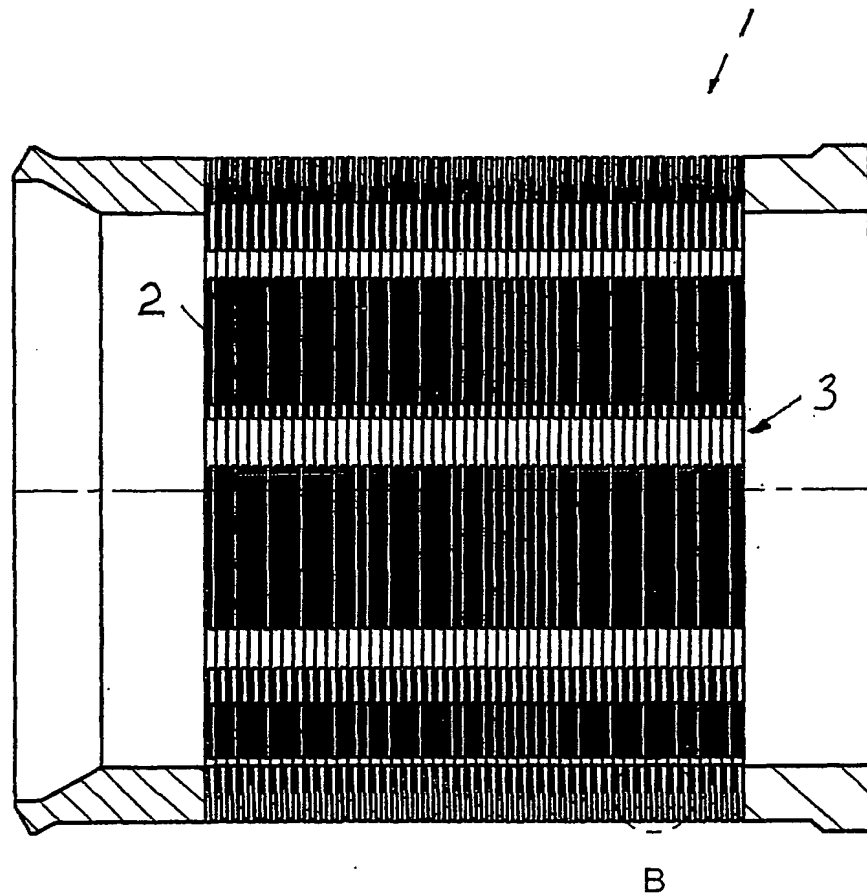
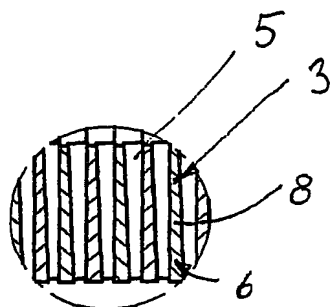


Fig. 1



DETAIL B

Fig. 2

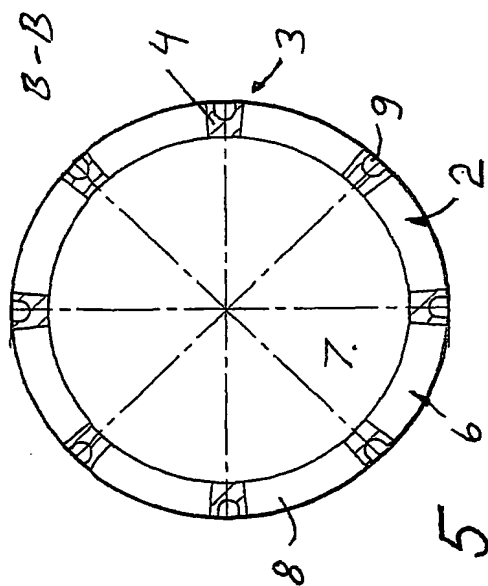


Fig. 5

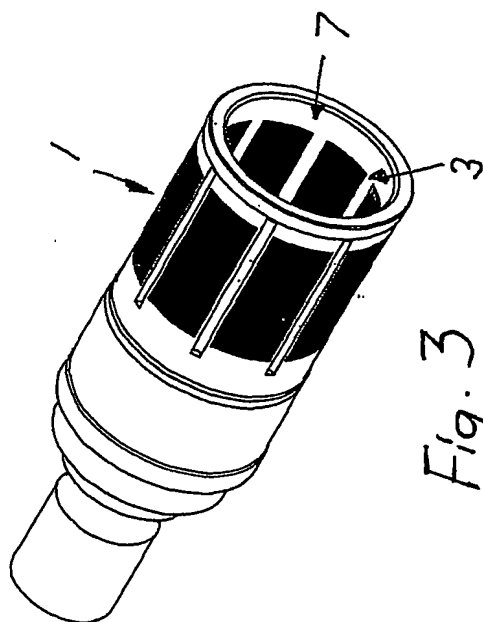


Fig. 3

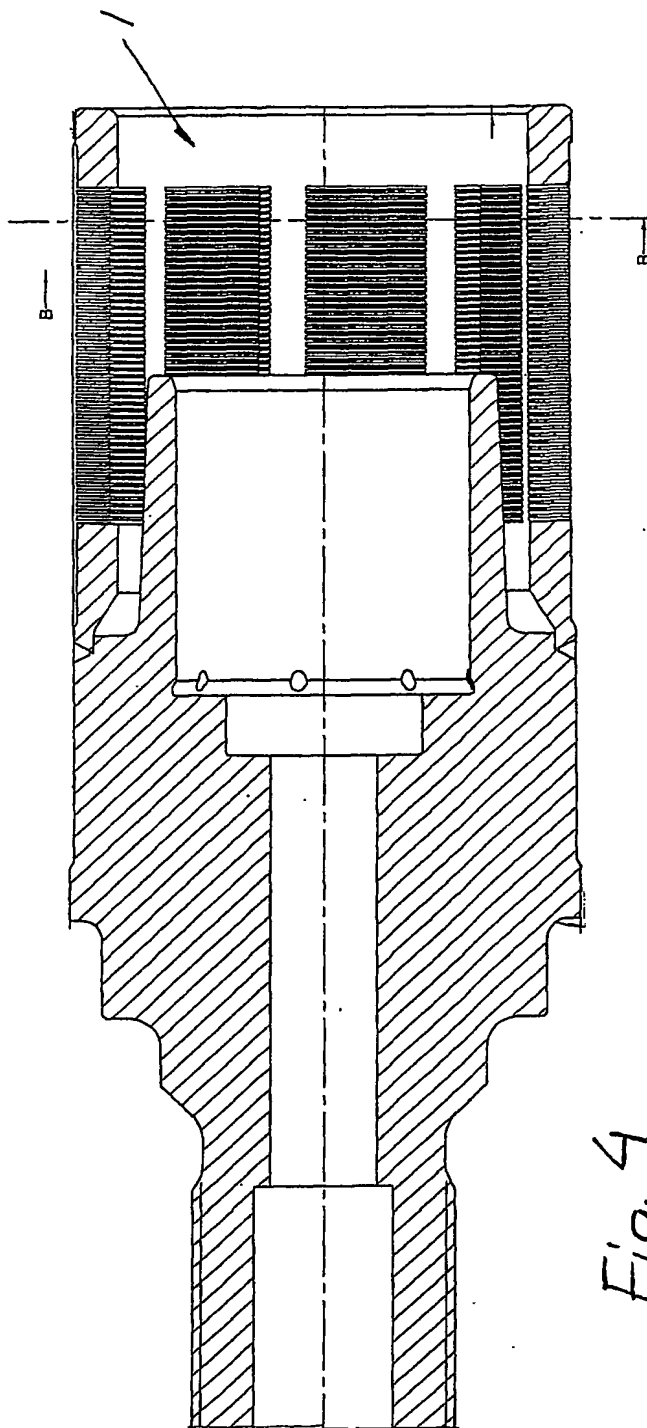


Fig. 4

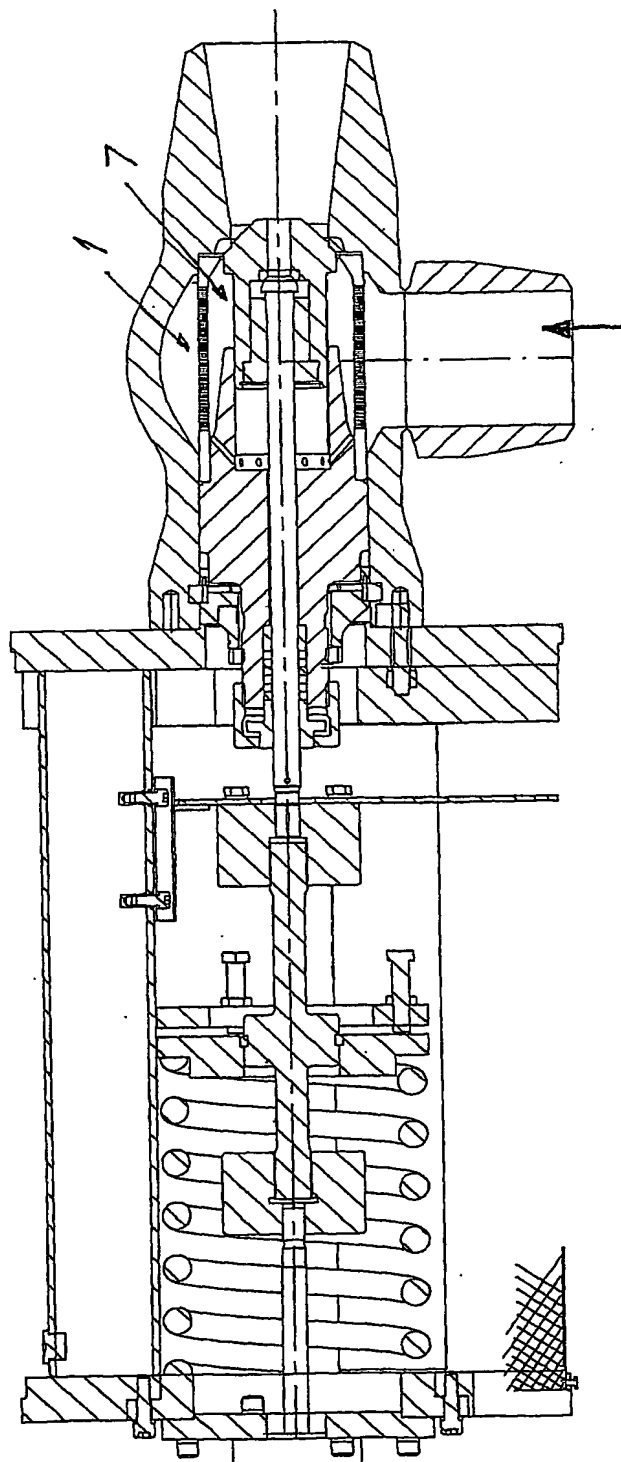


Fig. 6

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 03/01301

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B01D 29/46

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B01D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4726900 A (KESKINEN ET AL), 23 February 1988 (23.02.88) --	1-2
Y	US 4752394 A (MCKENZIE ET AL), 21 June 1988 (21.06.88), column 3, line 66 - column 4, line 2, figure 4 --	1-2
A	US 6391097 B1 (ROSENBERG), 21 May 2002 (21.05.02) -- -----	1-2

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

10 November 2003

Date of mailing of the international search report

17-11-2003

Name and mailing address of the ISA/
Swedish Patent Office
Box 5055, S-102 42 STOCKHOLM
Facsimile No. +46 8 666 02 86

Authorized officer

Jan Carlerud/ELY
Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

Information on patent family members

06/09/03

International application No.

PCT/SE 03/01301

Patent document cited in search report			Publication date	Patent family member(s)		Publication date
US	4726900	A	23/02/88	NONE		
<hr/>						
US	4752394	A	21/06/88	AU	575504 B	28/07/88
				AU	6490686 A	09/07/87
				EG	19183 A	30/12/94
				IN	170077 A	08/02/92
				PH	25968 A	13/01/92
<hr/>						
US	6391097	B1	21/05/02	AU	762646 B	03/07/03
				AU	5244200 A	09/01/01
				EP	1214132 A	19/06/02
				IL	130574 D	00/00/00
				WO	0078428 A	28/12/00
<hr/>						

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 03/01301

A. CLASSIFICATION OF SUBJECT MATTER		
IPC7: B01D 29/46 According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols)		
IPC7: B01D		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
SE,DK,FI,NO classes as above		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
EPO-INTERNAL, WPI DATA		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4726900 A (KESKINEN ET AL), 23 February 1988 (23.02.88) --	1-2
Y	US 4752394 A (MCKENZIE ET AL), 21 June 1988 (21.06.88), column 3, line 66 - column 4, line 2, figure 4 --	1-2
A	US 6391097 B1 (ROSENBERG), 21 May 2002 (21.05.02) -----	1-2
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search		Date of mailing of the international search report
10 November 2003		17-11-2003
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86		Authorized officer Jan Carlerud/ELY Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

Information on patent family members

06/09/03

International application No.

PCT/SE 03/01301

Patent document cited in search report			Publication date	Patent family member(s)	Publication date
US	4726900	A	23/02/88	NONE	
US	4752394	A	21/06/88	AU 575504 B	28/07/88
				AU 6490686 A	09/07/87
				EG 19183 A	30/12/94
				IN 170077 A	08/02/92
				PH 25968 A	13/01/92
US	6391097	B1	21/05/02	AU 762646 B	03/07/03
				AU 5244200 A	09/01/01
				EP 1214132 A	19/06/02
				IL 130574 D	00/00/00
				WO 0078428 A	28/12/00